



Urodynamics Profile In An Indonesian Tertiary Hospital

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Abstract: Background: Micturition disorder is one of the most common problems in urology. Due to the variability of the causes, the diagnosis might be difficult. Urodynamics examination remains the gold standard for examining the pathophysiology of dysfunction in the urinary tract, such as urinary incontinence (UI) or lower urinary tract symptoms (LUTS). This procedure allows to describe the pathology in filling phase and the voiding phase. Objective: To describe urodynamics profile of male patients with urinary symptoms in Soetomo General Hospital in the year 2017-2019 Methods: This research was a retrospective descriptive study. The data was collected from electronical medical records from all male patients with urinary symptoms that undergo urodynamic evaluation at Soetomo General Hospital from January 2017 to December 2019. The data is presented descriptively in table and narrative form. Results: There was a total of 80 patients included in this study. The majority of the patient was classified as elderly patients (>60 y.o.), with a total of 26 patients (32%). The most commonly reported symptom was urine retention in 23 patients (26.74%). Most of the patients had a Q-max result <10 mL/second (76.25%), PVR <150 mL (62.5%), and a post-urodynamic diagnosis of detrusor underactivity (DU). Half of the patients have a comorbid disease, with spinal dysfunction being the most commonly reported comorbidity in the patients (12.5%). All the patients undergo treatment for their symptoms. 75% of the patients were taking pharmacological treatments, while 25% of them underwent surgical procedures. Conclusion: Patients with urinary symptoms that underwent urodynamic evaluation most commonly reported a symptom of urinary retention. The urodynamic evaluation revealed that DU is the most commonly reported post-urodynamic diagnosis. Furthermore, urodynamic studies may differentiate patient needs for pharmacological treatment and undergone surgical procedures.

Keywords: urodynamics profile, urinary symptom, descriptive study.

I. INTRODUCTION

Micturition disorder is regarded as one of the most common disorders in the field of urology[1]. The speed, ease, cheapness, specificity, and non-invasiveness of diagnostic modality become the cornerstone for diagnosing this condition[2]. Currently, urodynamics studies are accepted as the gold standard for evaluating the pathophysiology of dysfunction in the urinary tract, such as urinary incontinence (UI) or lower urinary tract symptoms (LUTS). Urodynamic studies measure the pressure in the bladder during the filling phase while evaluating the flow rate of urine during the voiding phase to assess lower urinary tract function and explain the pathophysiology of patient complaints [3]. Pathophysiology of LUTS is multifactorial, and two-thirds of men with LUTS are BPO according to urodynamics criteria. LUTS are differentiated into storage symptoms and voiding symptoms. Apart from these symptoms, the underlying pathophysiology is limited to five conditions: 1) bladder outlet obstruction (BOO), 2) impaired detrusor contractility (IDC), 3) detrusor overactivity (DO), 4) low bladder compliance (LBC), and 5) sensory urgency (SU). Furthermore, clinical judgment may not be adequate to determine the causative of LUTS, and several studies have shown a lack of correlation between symptoms and urodynamics data. Therefore, the only way to assess pathophysiology is by performing the urodynamics evaluation. Determining the urodynamics abnormalities that cause LUTS is important to treat the patient accurately based on the pathophysiology of the disease³. Currently, data on micturition disorder and urodynamic patients profile in Indonesia are still limited. Therefore, we aim to describe the urodynamics profile of male patients with urinary symptoms in Soetomo General Hospital.

II. MEDHODS

This research was a retrospective descriptive study conducted at the Soetomo General Hospital. The data was collected from electronical medical records with total sampling technique from all male patients with urinary symptoms that undergo urodynamic evaluation at Soetomo General Hospital from January 2017 to December 2019. The data that were collected in this study includes age, symptom, Q-max, post-void residual (PVR), diagnosis pre-diagnostic, diagnosis post-diagnostic, comorbid, and type of therapy of male patients that undergo urodynamic examination. The collected data were grouped and reported descriptively in the form of tables and narratives. This study has been approved by the ethical committee of soetomo general hospital.

III. RESULT

There was a total of 80 patients included in this study with the following characteristics: The age of the patients was ranged from 7 to 85 years old, with the majority of the patients were classified as elderly age group (>60 years), and a small number of patients was found in the 0-10 years age group. From the collected data, there were various complaints of patients that became the basis for urodynamics examinations, including urinary hesitancy, weak stream, incontinence, urinary frequency, and urine retention. The most commonly reported symptom from the patients was urinary retention (28.75%), followed by urinary hesitancy (18.75%) (Table 1).

Table 1. Characteristics of Subjects Based on Age and Symptoms

Age group	n (%)
0 - 10	7 (8.75)
11 - 20	9 (11.25)
21 - 30	9 (11.25)
31 - 40	7 (8.75)
41 - 50	8 (10)
51 - 60	14 (17.5)
> 60	26 (32.5)
Symptoms	n (%)
Urinary hesitancy	15 (18.75)
Weak stream	8 (10)
Urgency	16 (20)
Straining	4 (5)
Frequency	14 (17.5)
Urine retention	23 (28.75)

Table 2. Characteristics of Subjects Based on Q-max

Q-Max range	n (%)
<10	61 (76.25)
10-15	6 (7.5)
>15	13 (16.25)

Table 3 . Characteristics of Subjects Based on PVR Range

PVR Range	n (%)
<150	50 (62.5)
150-400	26 (32.5)
>400	4 (5)

Uroflowmetry revealed that most of the patients had a maximum Q-max of <10 ml/second (76.25%), while 13 patients (16.25%) had a Q-max value >15 ml/second (Table 2). PVR examination revealed that most of the patients (62.50%) had a low-voided volume (<150ml), while the rest of the patients had PVR ranged from 150-400 ml. In addition, four patients (5%) had a PVR volume >400 ml (detrusor overdistention and decompensation) (Table 3). The result of this study showed that most of the patients that underwent urodynamics examination were diagnosed with urinary retention (31.25%), followed by urinary incontinence based on clinical and uroflowmetry (28.75%) . The most commonly reported post-urodynamic diagnosis were Detrusor underactivity (DU) and Low bladder Capacity + Low compliance + DU. There is more post-urodynamics diagnosis than the sample size because some of the patients have more than one diagnosis. In this research, we used a grouping method (Table 4).

Table 4. Characteristics Based on pre- and post- urodynamics Diagnosis

Pre urodynamics diagnosis	n (%)	Post urodynamics diagnosis									
		LBC	LC	DO	DU	BOO	AB	USI	BDU	N	Total
LUTS	21 (26.25)	8	5	2	8	1	0	0	3	3	30
Urine Retention	25 (31.25)	12	9	2	16	6	1	1	2	0	49
OAB	11 (13.75)	5	7	5	1	1	0	0	1	0	20
Incontinence Neurogenic	23 (28.75)	12	13	2	14	4	0	1	1	0	47
Total		37	34	11	39	12	1	2	7	3	146

*Abbreviation : LBC: Low bladder capacity; LC: low compliance; DO: Detrusor overactivity; DU: Detrusor underactivity; BOO: Bladder outlet obstruction; AB: Atonia bladder; USI: Urodynamics stress incontinence; BDU : Bladder outlet obstruction + detrusor underactivity; N: Normal

Half of the patients who underwent urodynamics examinations at Dr Soetomo General Hospital had no comorbidities (50%). In addition, the most commonly reported comorbidities were spinal dysfunction (12.5%), followed by hypertension (10%), Diabetes Mellitus (DM), and the combination of hypertension + diabetes mellitus (7.5%). In this study, the majority of the patients were treated with pharmacological therapy (75%), while the other (25%) undergone surgical procedures (Table 5).

Table 5. Characteristics based

Comorbidities, n (%)

on comorbidities

HT	8 (10)
DM	6 (7.5)
HT, DM	6 (7.5)
CVA	4 (5)
HT, CVA	2 (2.5)
CKD	1 (1.25)
Spinal Dysfunction	10 (12.5)
No Comorbid	40 (50)
Operation History	3 (3.75)

*Abbreviation : HT: Hypertension, DM: Diabetes Mellitus, CVA: Cerebrovascular accident, CKD: Chronic Kidney Disease

IV. PREPARE YOUR PAPER BEFORE STYLING

LUTS is one of the complain that significantly affect the quality of life of a patient. Due to the variability of the causes, the diagnosis might be challenging. Diagnosing the patients using urodynamics is considered important, as this procedure could help determine an accurate diagnosis and precise management for the patient. Urodynamics studies are primarily indicated to objectively evaluate the lower urinary tract function and its dysfunction to determine the appropriate therapeutic approach according to the associated pathological process[4]. Indonesia Continence Association recommends that patient with a urinary symptom which requires objective pathophysiological confirmation should undergo urodynamics examination to evaluate its cause [5].

Most of the patients who underwent urodynamics evaluation at RSUD Dr. Soetomo are classified as elderly. This result is in accordance with the study by Yunanto & Rahardjo at Cipto Mangunkusumo Hospital Jakarta, which showed that the distribution of patients undergoing urodynamics examinations ranges from 51 to 60 years old [6]. Madersbacher et al. also reported similar results which showed that the male population who underwent urodynamics studies had bell-shaped age distribution, with peaks between 61 and 70 years and mean age of 67 ± 9 years [7]. This high distribution is possibly caused by the nature of the disease of BPH and BPO that increased markedly with age [8].

This study showed that the patients who underwent urodynamics evaluation had varied symptoms, with urinary retention and hesitancy being the most commonly reported symptom. This finding is differ to a study by Gupta & Talywhich, which reported that nearly three-quarters of patients (72.2%) in urodynamics studies had complains of frequency, urgency, or urgent urinary incontinence. In contrast, only 20 patients (25.3%) had obstructive complains of retention, hesitancy, and straining[9]. This difference might be caused due to the different baseline characteristics between the subject. Some patients still do not recognize frequency as a symptom that could be treated with a medical approach.

Based on the result of this study, most of the patients reported a Q-max less than 10 ml/second. A similar finding was reported by Garg et al. conducted on a male population, which showed that the patient's average Q-max was 10.57 ml/second (range 5-20 ml/second)[10]. This condition is thought to be associated with the pathophysiology of obstruction in the urinary tract. Research by Nitti VW et al. showed that most of male patients with Bladder Outlet Obstruction (BOO) experience a decrease in flow rates, and 90% of men with Qmax of less than 10 mL/second are found to be obstruction. In contrast, 25% to 30% of men with the reduced

flow have no obstruction[3]. The possible cause of this abnormality includes the presence of balanitis, urethral stricture, and patients with post-urethroplasty procedures [11,12].

Data from this research showed that most of the patient had a low-voided volume. While the rest shows the Post Void Residual (PVR) volume, ranging from 150-400 ml (32.50%). A previous study by Elmissiry et al., Which retrospectively analyzed a pressure-flow study (PFS) of 81 men with BOO, found 30 men, PVR <100 mL, 30 men with PVR 100–450 mL, and 21 men with PVR > 450 mL[13]. Patients who showed a PVR volume > 400 ml (detrusor overdistention and decompensation) in this study were 5%. The findings are in line with other studies, despite the finding that PVR does not correlate well with signs and symptoms of bladder obstruction, PVR is an important part of the clinical examination of elderly male patients. PVR represents a function of detrusor contractility and BOO, but does not represent a definite detrusor obstruction or hypocontractility diagnosis. PVR can be used to identify patients at risk as well as to monitor disease progression in patients with BOO. In general, a PVR > 100 mL is considered high in elderly male patients[14].

The findings of this research showed that most of the patients had the pre-urodynamic diagnosis of urinary retention (25%), followed by incontinence (23%). This finding is different with the research by Yunanto & Rahardjo[6], which states that the most pre-urodynamics diagnoses are LUTS, followed by urinary retention, and OAB (Over-active Bladder). Although urinary retention in men is often thought to be the result of benign prostate hyperplasia, only 50% of this group meets the urodynamics criteria for BOO[15]. These findings are also consistent with previous studies that recorded only 50-80% of men with urinary retention, which is BOO-related[16].

This research also revealed that most of the patients who underwent urodynamics examinations at Dr. Soetomo General Hospital had no comorbidities. Meanwhile, in the population of patients with comorbidities, the most commonly reported comorbidities were spinal dysfunction, followed by hypertension. Significant comorbidity of bladder function is associated with spinal disorders, such as tuberculosis infection, and its presence can be recognized as a poor prognostic factor. Urological morbidity is strongly associated with nerve radix, and posterior segment involvement; disc disorders; and end-plate erosion[17]. These findings differ from research by Ragoori et al. which examined male patients with diabetes mellitus who underwent urodynamics examinations. The authors found that hypertension and chronic kidney disease are related comorbid diseases, with 23 patients (65.71%) having hypertension and 6 patients (17.14%) having chronic kidney disease[18].

The American Urological Association (AUA), which compared prospective RCTs related to an outcome in patients undergoing preoperative urodynamics testing, found no significant difference between patients who did not undergo urodynamics testing, in assessing utility, safety and value of urodynamics testing in patients who had a various choice of treatment modality. Further investigations are still needed to determine the benefits of optimal urodynamics testing prior to the choice of therapy[19]. The approach is also strengthened by the European association of urology (EAU) guidelines which suggest urodynamics examination if conservative therapy fails[20]. The majority of the patients who underwent the urodynamics evaluation in this study are primarily treated with pharmacological therapies. Most of the International Continence Society (ICS) recommendations regarding urodynamics examinations point to conclusions to conservative therapy, but it is necessary to review the disease mechanism by which drugs can provide a clinical response[21]. Anticholinergic drugs are the pharmacotherapy choice for urgent incontinence that can reduce incontinence by reducing the amplitude of contractions, increasing the volume of involuntary contractions of the bladder, and increasing the total bladder capacity[22]. Furthermore, clinical practitioners will perform urodynamics examinations after a failure of conservative therapeutic approach[21].

V. CONCLUSION

Patients with urinary symptoms that underwent urodynamic evaluation are characterized by elderly patients, with urinary retention being the most commonly reported symptom. The urodynamic evaluation revealed that DU is the most frequently reported post-urodynamic diagnosis. Half of the patients reported no comorbidity, while the most frequently reported comorbidity is spinal dysfunction. Urodynamics evaluation remains the gold standard for examining the pathophysiology of dysfunction in the urinary tract symptoms. This modality may differentiate patient needs for pharmacological treatment and undergone surgical procedures.

VI. ACKNOWLEDGMENT

We thank all urology department staff and the medical record staff of Dr. Soetomo General-Academic hospital.

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